Excerpts from the OSFM proposals for the 2016 Intervening Code Cycle for the California Fire Code

The complete package of OSFM proposals can be found at:
https://www.documents.dgs.ca.gov/bsc/2016InterCycle/ApprovedStandards/Aug2017/SFM-04-16-AppvdFET-Pt9.pdf

…
[Item 9. Plant Processing and Extraction]

[Chapter 1]

105.6.50 Plant extraction systems. *An operational permit is required to use a plant extraction system.*

105.7.20 Plant extraction systems. *A construction permit is required for installation of or modification* ***to a plant extraction system****. Maintenance performed in accordance with this code is not considered to be* ***modification*** *and does not require a construction permit.*

[Chapter 2]

SECTION 202 DEFINITIONS

DESOLVENTIZING *The act of removing a solvent from a material.*

MISCELLA *A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.*

[New Chapter]

CHAPTER 38

PLANT PROCESSING AND EXTRACTION FACILITIES

3801.1 Scope *Plant processing or extraction facilities shall comply with this chapter and the California Building Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material and production of the miscella, distillation of the solvent from the miscella and solvent recovery. The use, storage, transfilling, and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the California Building Code.*

3801.2 Existing buildings or facilities. *Existing buildings or facilities used for the processing of plants or where the medium of extraction or solvent is changed shall comply with this chapter.*

3801.3 Permits. *Permits shall be required as set forth in Section 105.6 and 105.7.*

SECTION 3802 DEFINITIONS

3802.1 Definitions *The following terms are defined in Chapter 2:*

DESOLVENTIZING
MISCELLA

SECTION 3803 PROCESSING AND EXTRACTION

3803.1 Construction. *Processing shall be located in a building complying with the California Building Code.*

3803.2 Prohibited occupancies. *Extraction processes utilizing flammable gasses or flammable cryogenic fluids shall not be located in any building containing a Group A, E, I or R occupancy.*

3803.3 Location. *The extraction equipment and extraction process utilizing hydrocarbon solvents shall be located in a room or area dedicated to extraction.*

3803.4 Post-process purification and winterization. *Post-processing and winterization involving the heating or pressurizing of the miscella to other than normal pressure or temperature shall be approved and performed in an appliance listed for such use. Domestic or commercial cooking appliances shall not be used.*

3803.5 Industrial ovens. *The use of industrial ovens shall comply with Chapter 30.*

3803.6 Use of flammable and combustible liquids. *The use of flammable and combustible liquids for liquid extraction processes where the liquid is boiled, distilled, or evaporated shall be located within a hazardous exhaust fume hood, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of flammable or combustible liquids over an open flame is prohibited.*

Exception: *The use of a heating element not rated for flammable atmospheres approved where documentation from the manufacture or approved testing laboratory indicates is it rated for heating of flammable liquids.*

3803.7 Liquefied Petroleum Gas *Liquefied-petroleum gases shall not be released to the atmosphere.*

Exception: *LPG gas may be released to the atmosphere in accordance with NFPA 58 Section 7.3.*

SECTION 3804 SYSTEMS AND EQUIPMENT

3804.1 General requirements. *Systems and equipment used with the processing and extraction of oils and products from plants shall comply with Sections 3804.2 through*

3804.4, 5003.2, other applicable provisions of this code, the California Building Code, and the California Mechanical Code.

3804.2 Systems and equipment. *Systems or equipment used for the extraction of oils from plant material shall be listed or approved for the specific use. If the system used for extraction of oils and products from plant material is not listed, then the system shall be reviewed by a Registered Design Professional.*
The Registered Design Professional shall review and consider any information provided by the system's designer or manufacturer. For systems and equipment not listed for the specific use, a technical report in accordance with Section 3804.3 shall be prepared and submitted to the fire code official for review and approval. The firm or individual preparing the technical report shall be approved by the fire code official prior to performing the analysis.

3804.3 Technical report. *The technical report which has been reviewed and approved by the fire code official, as required by Section 3804.2 is required prior to the equipment being located or installed at the facility. The report shall be prepared by a Registered Design Professional or other professional approved by the fire code official.*

3804.3.1 Report Content. *The technical report shall contain all of the following:*

1. *Manufacturer information.*

2. *Preparer of record on technical report.*

3. *Date of review and report revision history.*

4. *Signature page shall include all of the following:*

- ***4.1*** *Author of the report*
- ***4.2*** *Date of report*
- ***4.3*** *Date and signature of Registered Design professional of record performing the design or peer review.*

5. *Model number of the item evaluated. If the equipment is provided with a serial number, the serial number shall be included for verification at time of site inspection.*

6. *Methodology of the design or peer review process used to determine minimum safety requirements. Methodology shall consider the basis of design, and shall include a code analysis and code path to demonstrate the reason as to why specific code or standards are applicable or not.*

7. *Equipment description. A list of every component and sub-assembly (fittings, hose, quick disconnects, gauges, site glass, gaskets, valves, pumps, vessels, containers, switches, etc.) of the system or equipment, indicating the manufacturer, model number, material, and solvent compatibility. Manufacture' data sheets shall be provided.*

8. *A general flow schematic or general process flow diagram of the process. Post-processing or winterization may be included in this diagram. All primary components of the process equipment shall be identified and match the equipment list required in Item 7. Operating temperatures, pressures, and solvent state of matter shall be identified in each primary step or component. A*

piping and instrumentation diagram (PID or PI&D) shall be provided.

9. *Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis shall include purchased and fabricated components.*

10. *Structural analysis for the frame system supporting the equipment.*

11. *Process safety analysis of the extraction system, from the introduction of raw product to the end of the extraction process.*

12. *Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The process hazard analysis shall include a review of emergency procedure information provided by the manufacturer of the equipment or process and not that of the facility, building or room.*

13. *Review of the assembly instructions, operational and maintenance manuals provided by the manufacturer.*

14. *List of references used in the analysis.*

3804.4 Site inspection. *Prior to operation of the extraction equipment, where required by the fire code official, the engineer of record or approved professional, as approved in 3804.2 shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis. The engineer of record or approved professional shall provide a report of findings and observations of the site inspection to the fire code official prior to the approval of the extraction process. The field inspection report authored by engineer of record shall include the serial number of the equipment used in the process and shall confirm the equipment installed is the same model and type of equipment identified in the technical report.*

SECTION 3805 SAFETYSYSTEMS

3805.1 Gas detection. *For extraction processes utilizing flammable gases as solvents, a continuous gas detection system shall be provided. The gas detection threshold shall be no greater than 25% of the lower flammable limit (LFL) of the materials.*

3805.1.1 System design. *The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used for the extraction process. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).*

3805.1.2 Gas detection system components. *Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.*

3805.1.3 Operation. *Activation of the gas detection system shall result in all the following:*

1. *Initiation of distinct audible and visual alarm signals in the extraction room.*

2. Deactivation of all heating systems located in the extraction room.

3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

3805.1.4 Failure of the gas detection system. *Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.*

3805.1.5 Interlocks. *All electrical components within the extraction room shall be interlocked with the gas detection system. Activation of the gas detection system shall disable all light switches and electrical outlets.*

3805.2 Emergency shutoff. *Extraction processes utilizing gaseous hydro-carbon based solvents shall be provided with emergency shutoff systems in accordance with Section 5803.1.3.*

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 10. Carbon dioxide enrichment systems]

[Chapter 1]

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105.6.4.1 Carbon dioxide enrichment systems. *An operational permit is required for carbon dioxide enrichment systems having more than 874 cu. ft. scf (100 pounds) of carbon dioxide.*

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TABLE 105.6.9

PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide enrichment systems	*874 (100* lbs)
Corrosive	20
Flammable (except cryogenic fluids and liquefied petroleum	20
Highly toxic	Any
Inert and simple asphyxiate[a]	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any
Toxic	Any

For SI: 1 cubic foot = 0.02832 m^3.
a. *For carbon dioxide used in beverage dispensing applications, see Section 105.6.4.*

[Chapter 2]

SECTION 202 DEFINITIONS

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CARBON DIOXIDE ENRICHMENT SYSTEM *A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.*

[Chapter 9]

…

908.8 Carbon dioxide enrichment systems. *A gas detection system shall be provided in rooms and indoor areas in which carbon dioxide enrichment processes are located in accordance with Section 5307.3.4.*

[Chapter 53]

SECTION 5307
~~CARBON DIOXIDE (CO2) SYSTEMS USED IN BEVERAGE DISPENSING APPLICATIONS~~
COMPRESSED GASES NOT OTHERWISE REGULATED

~~**5307.1 General.** Carbon dioxide systems with more than 100 pounds (45.5 kg) of carbon dioxide used in beverage dispensing applications shall comply with Sections 5307.2 through 5307.5.2.~~

5307.1 General. Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55 and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter. Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3. Carbon dioxide enrichment systems shall comply with Section 5307.4. Areas other than those covered by Sections 5307.3 or 5307.4 shall comply with Section 5307.2.

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~~**5307.4**~~ ***5307.3.1*** **Protection from damage**. Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment
during normal facility operations

5307.4 Carbon dioxide enrichment systems*. The design, installation and maintenance of carbon dioxide enrichment systems with more than 100 pounds of carbon dioxide, and carbon*

dioxide enrichment systems with any quantity of carbon dioxide having a remote fill connection, shall comply with Sections 5307.4.1 through 5307.4.8.

5307.4.1 Documentation. *The following information shall be provided with the application for permit:*

1. *Total aggregate quantity of liquid CO2 in pounds or cubic feet at normal temperature and pressure.*
2. *Location and total volume of the room where the carbon dioxide enrichment operation will be conducted. Identify whether the room is at grade or below grade.*
3. *Location of containers relative to equipment, building openings and means of egress.*
4. *Manufacturer's specifications and pressure rating, including cut sheets, of all piping and tubing to be used.*
5. *A piping and instrumentation diagram that shows piping support and remote fill connections.*
6. *Details of container venting, including but not limited to vent line size, material and termination location.*
7. *Alarm and detection system and equipment, if applicable.*
8. *Seismic support for containers.*

5307.4.2 Equipment. *Pressure relief, vent piping, fill indicators, fill connections, vent terminations, piping system, and the storage, use, and handling of the carbon dioxide shall be in accordance with Chapter 53 and NFPA 55.*

5307.4.3 Gas detection system. *A gas detection system shall be provided in the room or indoor area in which the carbon dioxide enrichment process is located, in the room or indoor area in which the container systems are located, and in other areas where carbon dioxide is expected to accumulate. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or leaks are most likely to occur. The system shall be designed as follows:*

1. Activate a low-level alarm upon detection of a carbon dioxide concentration of 5,000 ppm (9,000 mg/m3).
2. Activate a high-level alarm upon detection of a carbon dioxide concentration of 30,000 ppm (54,000 mg/m3).

5307.4.3.1 System Activation. *Activation of the low level gas detection system alarm shall automatically:*

1. *Stop the flow of carbon dioxide to the piping system.*
2. *Activate the mechanical exhaust ventilation system.*
3. *Activate an audible and visible supervisory alarm signal at an approved location within the building.*

Activation of the high level gas detection system alarm shall automatically:

1. *Stop the flow of carbon dioxide to the piping system.*
2. *Activate the mechanical exhaust ventilation system.*
3. *Activate an audible and visible evacuation alarm both inside and outside of the carbon dioxide enrichment area, and the area in which the carbon dioxide containers are located.*

5307.4.4 Pressurization and ventilation. *Rooms or indoor areas in which carbon dioxide enrichment is provided shall be maintained at a negative pressure in relation to the surrounding areas in the building. A mechanical ventilation system shall be provided in accordance with the California Mechanical Code that complies with all of the following:*

1. *Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot.*
2. *When activated by the gas detection system the mechanical ventilation system shall remain on until manually reset.*
3. *The exhaust system intakes shall be taken from points within 12 inches of the floor.*
4. *The ventilation system piping shall terminate outdoors in an approved location.*

5307.4.5 Signage*. Hazard identification signs shall be posted at the entrance to the room and indoor areas where the carbon dioxide enrichment process is located, and at the entrance to the room or indoor where the carbon dioxide containers are located. The sign shall be a minimum 8 in. (200 mm) wide and 6 in. (150 mm) high and indicate:*

CAUTION- CARBON DIOXIDE GAS

Ventilate the area before entering.

A high carbon dioxide (CO2) gas concentration

In this area can cause asphyxiation.

5307.4.6 Seismic and structural design*. Carbon dioxide system containers and piping shall comply with the seismic design requirements in Chapter 16 of the California Building Code and shall not exceed the floor loading limitation of the building.*

5307.4.7 Container refilling. *Carbon dioxide containers located indoors shall not be refilled unless filled from a remote connection located outdoors.*

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5307.5.1 Ventilation*. Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with the requirements of Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.*

Exception: *A gas detection system complying with Section 5307.4.3 shall be permitted in lieu of mechanical ventilation.*

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~~**SECTION 5308**~~
~~**COMPRESSED GASES**~~
~~**NOT OTHERWISE REGULATED**~~

~~**5308.1 General.** Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55 and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.~~
~~**5308.2 Ventilation.** Indoor storage and use areas and storage buildings shall be provided with mechanical exhaust ventilation~~
~~or natural ventilation in accordance with the requirements of Section 5004.3 or 500S.I.9. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.~~

Notation

Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2

Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2